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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/785,486	02/20/2001	Shinji Takeda	TM&K0008	9092

7590 12/19/2001
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EXAMINER

GRAYBILL, DAVID E

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 12/19/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/785,486	Applicant(s) SHINJI TAKEDA	
	Examiner David E Graybill	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/981,702.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2,7,9-11</u> . | 6) <input type="checkbox"/> Other: _____ |

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The amendment filed 2-20-01 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is the claim 40 limitation, "said material is an organic material comprising . . . 4,4'-diaminophenyl ether."

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim 40 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The non-described subject matter is the limitation, "said material is an organic material comprising . . . 4,4'-diaminophenyl ether."

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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In the rejections infra, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 18, 19, 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Morita (5406124).

At column 3, line 63 to column 4, line 35; column 7, lines 6-9; column 8, lines 1-8 and 24-47; column 9, lines 14-35; column 10, lines 14-15; column 14, lines 3-14 and 40-46; column 16, lines 18-34; column 17, lines 13-14; and column 18, lines 1-10 and 29-30, Morita teaches the following:

18. A material 4 comprising an organic die-bonding film having the property of bonding a semiconductor chip 1 to a support member 2 under conditions of 100-250°C temperature and pressure of 0.1-30 gf/mm², and having a saturation moisture absorption of 1.0% by volume or less.

19. A material comprising an organic die-bonding film having the property of bonding a semiconductor chip to a support member

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under conditions of 100-250°C temperature and pressure of 0.1-30 gf/mm², and having a modulus of elasticity of 10 MPa or less at a temperature of 250°C.

21. A material comprising an organic die-bonding film having the property of bonding a semiconductor chip to a support member under conditions of 100-250°C temperature and pressure of 0.1-30 gf/mm², having a residual volatile component in an amount of not more than 3.0% by weight.

22. A material comprising an organic die-bonding film having the property of bonding a semiconductor chip to a support member under conditions of 100-250°C temperature and pressure of 0.1-30 gf/mm², having a water absorption of 1.5% by volume or less.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered

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therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 17, 23-27, 31, 33, 35, 37, and 42-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita (5406124).

As cited, Morita teaches the following:

17. A material comprising an organic die-bonding film having a peel strength when a semiconductor has been bonded to a support material under conditions of 100-250°C temperature and pressure of 0.1-30 gf/mm².

23. A material according to 17, comprising an organic die-bonding film further having a modulus of elasticity of 10 Mpa or less at a temperature of 250°C.

24. A material according to 23, comprising an organic die-bonding film further having a water absorption of 1.5% by volume or less.

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25. A material according to 24, comprising an organic die-bonding film further having a residual volatile component in an amount of not more than 3.0% by weight.

26. A material according to 25, comprising an organic die-bonding film further having a saturation moisture absorption of 1.0% by volume or less.

27. A material according to 26, comprising an organic die-bonding film further having a void volume of 10% or less in terms of voids present in the material and at an interface between said material and a support member at a stage where a semiconductor had been bonded to a support member by said material.

31. A material according to 17, being a self-supporting film.

33. A material according to 17, having a single layer structure.

35. A material according to 17, wherein said material is an organic material comprising one or more components selected from the group consisting of epoxy resin, silicone resin, acrylic resin, and polyimide resin.

37. A material according to 17, wherein said material is an organic material comprising a polyimide resin.

42. A material according to 17, wherein said material is an organic material comprising a polyimide synthesized from 1,2-

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(ethylene)bis(trimellitate anhydride) and 2,2-bis[4-(4-aminophenoxy)phenyl] propane.

43. A material according to 17, wherein said material is an organic material comprising a polyimide synthesized from 1,2-(ethylene)bis(trimellitate anhydride), 1,10-(decamethylene)bis(trimellitate anhydride, and 2,2-bis[4-(4aminophenoxy)phenyl] propane.

44. A material according to 17, wherein said material is an organic material comprising a polyimide synthesized from 1,10-(decamethylene)bis(trimellitate anhydride), and 2,2-bis[4-(4-aminophenoxy)phenyl] propane.

45. A material according to 17, wherein said material is an organic material comprising an epoxy resin.

46. A material according to 17, wherein said material is an organic material comprising a polyimide resin and an epoxy resin.

47. A material according to 35, further comprising a metal filler.

48. A material according to 36, further comprising a metal filler.

49. A material according to 36, made by a process comprising the steps of coating a varnish on a carrier film and peeling the die bonding material from said carrier film.

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50. A material according to 36, made by a process comprising the steps of coating a varnish on a carrier film and peeling the die bonding material from said carrier film.

Although Morita teaches a material at a stage where a semiconductor has been bonded to a support member using the material, Morita does not appear to explicitly teach that the material has a peel strength of 0.5 kgf/5 mm x 5 mm chip or higher at the stage.

Furthermore, it cannot be determined if the teaching of Morita of a 90 degree peel strength of 67g/10mm² chip is equivalent to the instant disclosure of a 17 degree peel strength of 0.5 Kgf/5 x 5 mm chip or above because the conversion factor between the two different peel strength measuring techniques is unknown. Nonetheless, as cited, Morita teaches that an increase in peel strength is desirable, and it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed peel strength range because applicant has not disclosed that the range is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears prima facie that the product and process would possess utility using another range. Indeed, it has been held that

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optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

In the interest of compact prosecution, applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that is reasonably necessary to the examination of this application.

In response to this requirement, please state the specific improvements of the subject matter in claim 30, specifically, the limitation, "a peel strength of 0.5 Kgf/5 x 5 mm chip or higher" over the disclosed teaching of Morita of a 90 degree peel strength of 67g/10mm², and indicate the specific elements in the claimed subject matter that provide those improvements.

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained will be accepted as a complete reply to the requirement for that item.

This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period

for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Although Morita does not appear to explicitly teach the process limitations "coating a varnish on a carrier film and peeling the die bonding material from said carrier film," the product of Morita inherently possesses the structural characteristics imparted by the process limitation. See *In re Fitzgerald, Sanders, and Bagheri*, 205 USPQ 594 (CCPA 1980).

Claims 20, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita as applied to claims 18, 19, 21 and 22, and further in combination with Hozoji (JP5-218107).

As cited, Morita teaches the following:

20. A material comprising an organic die-bonding film having the property of bonding a semiconductor chip to a support member under conditions of 100-250°C temperature and pressure of 0.1-30 gf/mm², at a stage where a semiconductor has been bonded to a support member by said material.

However, Morita does not appear to explicitly teach a void volume of 10% or less in terms of voids present in the material and at an interface between said material and a support member.

Nonetheless, in the English abstract and Table 1, Hozoji teaches a material having a void volume of 10% or less in terms of voids present in the material and at an interface between

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said material and a support member. Moreover, it would have been obvious to combine the product of Hozoji with the product of Morita because it would facilitate adhesion.

To further clarify the teaching of a void volume of 10% or less, it is noted that Hozoji teaches that a defect such as a void, etc., is eliminated.

In addition, in the combination, Morita teaches the following:

28. A material according to 20, comprising an organic die-bonding film further having a water absorption of 1.5% by volume or less, having a saturation moisture absorption of 1.0% by volume or less, and having a modulus of elasticity of 10 MPa or less at a temperature of 250°C.

29. A material according to claim 20, comprising an organic die-bonding film further having a saturation moisture absorption of 1.0% by volume or less, having a modulus of elasticity of 10 MPa or less at a temperature of 250°C, and having a peel strength.

Although Morita teaches a material at a stage where a semiconductor has been bonded to a support member using the material, Morita does not appear to explicitly teach that the material has a peel strength of 0.5 kgf/5 mm x 5 mm chip or higher at the stage.

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Furthermore, it cannot be determined if the teaching of Morita of a 90 degree peel strength of 67g/10mm² chip is equivalent to the instant disclosure of a 17 degree peel strength of 0.5 Kgf/5 x 5 mm chip or above because the conversion factor between the two different peel strength measuring techniques is unknown. Nonetheless, as cited, Morita teaches that an increase in peel strength is desirable, and it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed peel strength range because applicant has not disclosed that the range is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears prima facie that the product and process would possess utility using another range. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical.

Claims 30, 32, 34, 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita as applied to claims 17, 23-27, 31, 33, 35, 37, and 42-50, and further in combination with Hozoji (JP5-218107).

As cited, Morita teaches the following:

30. A material comprising an organic die-bonding film having the property of bonding a semiconductor chip to a support member under conditions of 100-250°C temperature and pressure of 0.1-30 gf/mm², and having a water absorption of 1.5% by volume or less, a saturation moisture absorption of 1.0% by volume or less, a modulus of elasticity of 10 MPa or less at a temperature of 250°C, at a stage where a semiconductor has been bonded to a support member by said material, a peel strength at a stage where a semiconductor has been bonded to a support member with said material, and a residual volatile component in an amount of not more than 3.0% by weight.

However, Morita does not appear to explicitly teach a void volume of 10% or less in terms of voids present in the material and at an interface between said material and a support member, and a saturation moisture absorption of 1.0% by volume or less.

Nonetheless, in the English abstract and Table 1, Hozoji teaches a material having a void volume of 10% or less in terms of voids present in the material and at an interface between said material and a support member, and a saturation moisture absorption of 1.0% by volume or less. Moreover, it would have been obvious to combine the product of Hozoji with the product of Morita because it would facilitate adhesion.

To further clarify the teaching of a void volume of 10% or less, it is noted that Hozoji teaches that a defect such as a void, etc., is eliminated.

In addition, in the combination, Morita teaches the following:

32. A material according to 30, being a self-supporting film.

34. A material according to 30, having a single layer structure.

36. A material according to 30, wherein said material is an organic material comprising one or more components selected from the group consisting of epoxy resin, silicone resin, acrylic resin, and polyimide resin.

38. A material according to 30, wherein said material is an organic material comprising a polyimide resin.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morita as applied to claims 17, 23-27, 31, 33, 35, 37, and 42-50, and further in combination with Jackson (4965331).

Morita does not appear to explicitly teach the following:

39. A material according to 17, wherein said material is an organic material comprising bis(4-amino-3,5-dimethylphenyl)methane.

Nevertheless, as cited, Morita teaches an "aromatic diamine," and at column 2, lines 41-59, Jackson teaches an

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organic material comprising the aromatic diamine bis(4-amino-3,5-dimethylphenyl)methane. In addition, it would have been obvious to combine the product of Jackson with the product of Morita because it would provide an aromatic diamine.

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morita as applied to claims 17, 23-27, 31, 33, 35, 37, and 42-50, and further in combination with Kunimune (4656238).

Morita does not appear to explicitly teach the following:
40. A material according to 17, wherein said material is an organic material comprising 4,4'-diaminophenyl ether.

Notwithstanding, as cited, Morita teaches an "aromatic diamine," and at column 18, lines 29-30, Kunimune teaches an organic material comprising the aromatic diamine 4,4'-diaminophenyl ether. In addition, it would have been obvious to combine the product of Kunimune with the product of Morita because it would provide an aromatic diamine.

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morita as applied to claims 17, 23-27, 31, 33, 35, 37, and 42-50, and further in combination with Baumann (5296567).

Morita does not appear to explicitly teach the following:

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41. A material according to 17, wherein said material is an organic material comprising bis(4-amino-3,5-diisopropylphenyl)methane.

Notwithstanding, as cited, Morita teaches an "aromatic diamine," and at column 5, lines 4-34; and column 5, lines 1-5, Baumann teaches an organic material comprising the aromatic diamine bis(4-amino-3,5-diisopropylphenyl)methane. In addition, it would have been obvious to combine the product of bis(4-amino-3,5-diisopropylphenyl)methane with the product of Morita because it would provide an aromatic diamine.

This Office action has an attached requirement for information under 37 CFR 1.105. A complete reply to this Office action must include a complete reply to the attached requirement for information. The time period for reply to the attached requirement coincides with the time period for reply to this Office action.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to the group receptionist whose telephone number is 703-308-1782.

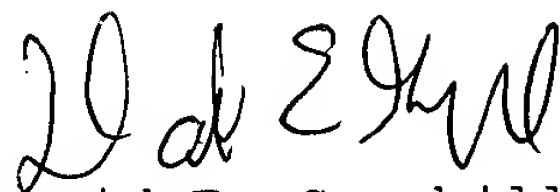
Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/305-3431.

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A handwritten signature in black ink, appearing to read "D. E. Graybill".

David E. Graybill
Primary Examiner
Art Unit 2814

D.G.
17-Dec-01